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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,390	04/14/2005	YuanKai Zheng	AGSGP011	1807
25920	7590	09/05/2006	EXAMINER	
MARTINE PENILLA & GENCARELLA, LLP			LE, THONG QUOC	
710 LAKEWAY DRIVE				
SUITE 200			ART UNIT	PAPER NUMBER
SUNNYVALE, CA 94085			2827	

DATE MAILED: 09/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/507,390	Applicant(s) ZHENG ET AL.	
	Examiner Thong Q. Le	Art Unit 2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. Claims 1-26 are presented for examination.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because the format of abstract is improper. Correction is required. See MPEP § 608.01(b).

The new properly abstract is required.

Claim Objections

5. Regarding claim 13, line 2, should be deleted "c" before space layer.
6. Regarding claim 25, line 1, should be deleted ")" before MRAM.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Regarding claims 8, 22, the disclosed invention is inoperative and therefore lacks utility. Since the condition for number of N, assume if N equals 1, the equation will be invalid. Claim must be amended for more clearly.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Bessho et al. (U.S. Patent No. 6,178,112).

Regarding claims 1, 16, Bessho et al. disclose a multistate magnetoresistive random access memory (MRAM) unit (Figure 2) comprising:

a substrate (Figure 8, 31),

a plurality of memory cells (Figure 2. A, B, C) formed on said substrate (Figure 8),

a bit line (Figure 2, B) and a word line (Figure 2, W) in electrical contact with said plurality of memory cells (Figure 2);

each of said plurality of memory cells (Figure 8) including a first magnetic layer (Figure 8, M4), a second magnetic layer (Figure 8, M3) and a non-magnetic space layer (Figure 8, 33),

wherein a heat element (Figure 21, 112, Column 32, lines 12-20, lines 55-60) adjacent an individual cell in said plurality of memory cells heats said first magnetic layer of said cell to near its Curie point independently of other cells (Column 28, lines 20-45) , and

the magnetization vector of said first magnetic layer is aligned with a magnetic field generated by a current applied to the bit line and word line (Column 20-25).

Regarding claim 2, Bessho et al. disclose wherein said first magnetic layer has a first Curie point and said second magnetic layer has a second Curie point that is higher than the first Curie point (Figure 19, 100, 101, Column 16-38).

Regarding claims 3-7, Bessho et al. disclose wherein the first magnetic layer is a recording layer (Column 1, lines 7-12, Figure 14, 40, Column 24, lines 8-9), and the second magnetic layer is a read layer (Figure 14, 45, Column 26, lines 64-65), and wherein the direction of the magnetization vector in said second magnetic layer is changed to an anti-parallel alignment with its initial magnetization vector by the magnetic field generated by the current in the word line during a read operation (Figure

16, M8, M10), and wherein, the magnetization vector in said first magnetic layer can be aligned at a plurality of angles relative to the magnetization vector of said second magnetic layer (Figure 26).

Regarding claims 10-11, Bessho et al. disclose wherein the magnetoresistance of said plurality of memory cells is dependent upon the angles between the magnetization vectors of said first and second magnetic layers (Figure 26, Column 14, lines 23-28), and wherein the plurality of memory cells are coupled into an array with each cell being individually addressable (Figure 2).

Regarding claims 12-13, 17, 19, Bessho et al. disclose wherein, said plurality or memory cells is a plurality of stacked cells including a magnetic tunnel junction cell (MTJ), or a spin-valve cell (SV) or a pseudo spin- valve (PSV) cell (Figure 1, Column 12, lines 60-61, Column 39, lines 60-63), and wherein the non-magnet space layer is a non-magnetic conductive layer in a SV cell and an insulator tunneling layer in a MTJ cell (Figure 30, 117, Column 39, lines 59-67).

Regarding claim 14, Bessho et al. disclose a method of writing data in a magnetoresistive random access memory (MRAM) unit comprising a plurality of memory cells, a bit line and a word line in electrical contact with said plurality of memory cells, a heat element adjacent an individual cell in said plurality of memory cells, the method (Column 3, lines 63-67) including the steps of:

raising the temperature of a first magnetic layer in said individual cell to near its Curie point independently of other cells, thereby reducing the coercivity of said layer (Column 4, lines 28-40);

writing a magnetization state in said first magnetic layer of said individual cell by passing a current through said bit line and said word line, the current in said bit line and said word line acting cooperatively to align the magnetization vector in said first magnetic layer with a magnetic field generated by said current (Column 4, lines 41-62).

Regarding claim 15, Bessho et al. disclose wherein the step of raising the temperature of said first magnetic layer is provided by applying an initial current through said individual cell (Figure 1, Column 37, lines 38-44).

Regarding claim 18, Bessho et al. disclose wherein for MTJ memory cells, the heat element is a non-linear element (column 51, lines 30-32).

Regarding claim 21, Bessho et al. disclose a method of performing a read operation in a magnetoresistive random access memory (MRAM) unit comprising a plurality of memory cells, a bit line and a word line in electrical contact with said plurality of memory cells, a heat element adjacent an individual cell in said plurality of memory cells, the method including the steps of:

applying a current through said bit line and said word line (Figure 2) , determining the magnetization state of said first magnetic layer, wherein the resistance states of said first magnetic layer is dependent, on the relative angles between the magnetization vectors of said first and second magnetic layers (column 9, lines 45-51), and said resistance states representing the magnetization states of the MRAM, and reading data represented by said magnetization states stored in said memory cells (Column 9, lines 36-51), and wherein the direction of the magnetization vector in a second magnetic layer is changed to an anti-parallel alignment with its initial magnetization vector by a

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magnetic field generated by the current through said word line (Figures 1, 41), and wherein the first magnetic layer is a recording layer (Figure 14, 40) and the second magnetic layer is a read layer (Figure 14, 45), and wherein for a spin valve SV MRAM, the current is applied through said bit line (Figure 2), and wherein for a magnetic tunnel junction cell (MTJ), the current is applied through said bit line and word line (Figure 2).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thong Q. Le whose telephone number is 571-272-1783. The examiner can normally be reached on 8:00am-5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zarabian Amir can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thong Q. Le
Primary Examiner
Art Unit 2827

